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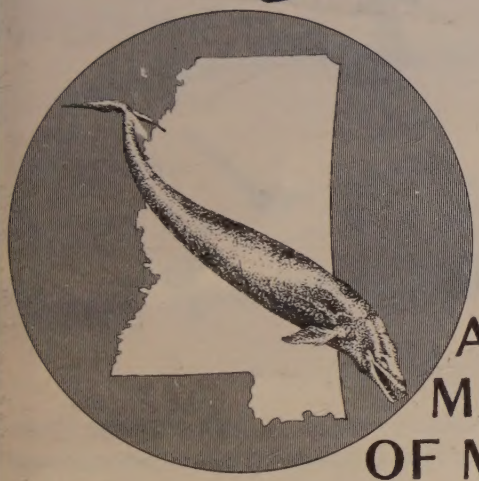

ARCHAEOCETES: WHALE - LIKE MAMMALS FROM THE EOCENE OF MISSISSIPPI

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Introduction

Certainly, we have all wondered what Mississippi was like millions of years ago before the land was exposed to air, before our rich soil was formed, and even before the first men arrived to create our state's boundaries. One way man has found to interpret the past is through the study of fossils: the remains of plants and animals which lived on earth thousands and millions of years ago. Mississippi is virtually a storehouse of fossils which can be interpreted to create a scenario of past environments. One group of these extinct animals, which are very abundant in Mississippi and the southeastern United States, is the archaeocete whales.

The mammalian order Cetacea constitutes the largest group of mammals which have adapted to aquatic life. The whales have become completely divorced from their former terrestrial existence in almost every way. Only in the need to surface for air do they remain linked to their ancient habitat. The archaeocetes are the oldest known and most primitive of cetaceans, having lived throughout the world between 40 and 60 million years ago. Features of the archaeocete skull suggest affinities with primitive carnivorous land mammals, which flourished during the early Tertiary. The peak of archaeocete development was attained in the *Basilosaurus* group, some of which reached lengths of 70 feet. With their slim and elongate bodies, these early whales swam the warm marine seas about 55 million years ago, feeding upon fish and other marine animals. This extinct group of whales may hold many answers in understanding the origin and development of marine mammals.

The early discoveries of these whale-like mammals may be of historical interest to many who live in the Southeast. In 1832, the American Philosophical Society directed Dr. Richard Harlan to publish an account of the first discovery of an archaeocete whale. Upon studying the 28

vertebrae from near the Ouachita River in Caldwell Parish, Louisiana, Harlan assigned the bones to be reptilian and named the beast *Basilosaurus*, which means "king of the lizards". A few years later after restudy by Professor Richard Owen of England, *Basilosaurus* was renamed *Zeuglodon cetoides*, alluding to the yoke-like shape of the cheek teeth and the whale-like vertebrae. Since scientists have always given order to things, the name of the first archaeocete was later changed back to *Basilosaurus* following international rules of nomenclature. Shortly after this first discovery of what was originally thought to be a "giant sea serpent", world-wide attention blossomed into a multitude of expeditions in search of these marine mammals in the Jackson Group (Eocene) throughout Georgia, Alabama, Mississippi, and Louisiana. These early expeditions produced a variety of discoveries which are detailed in Remington Kellogg's 1936 publication entitled "A Review of the Archaeoceti". Since the early expeditions, many types of archaeocete whales have been found, and Mississippi has provided some of these new records.

Whales in Mississippi?

Most of Mississippi's geologic past has been a series of marine depositions which have left rocks as old as 250 million years old in the extreme northeastern part of the state. Even today, geologic processes are depositing marine sediments near the Mississippi Gulf Coast much like the sediments deposited across the middle of Mississippi approximately 55 million years ago during the Eocene Period. What's the difference? Time and space.

Figure 1. The skull of the *Zygorhiza kochii* is now housed at the Museum of Natural Science.

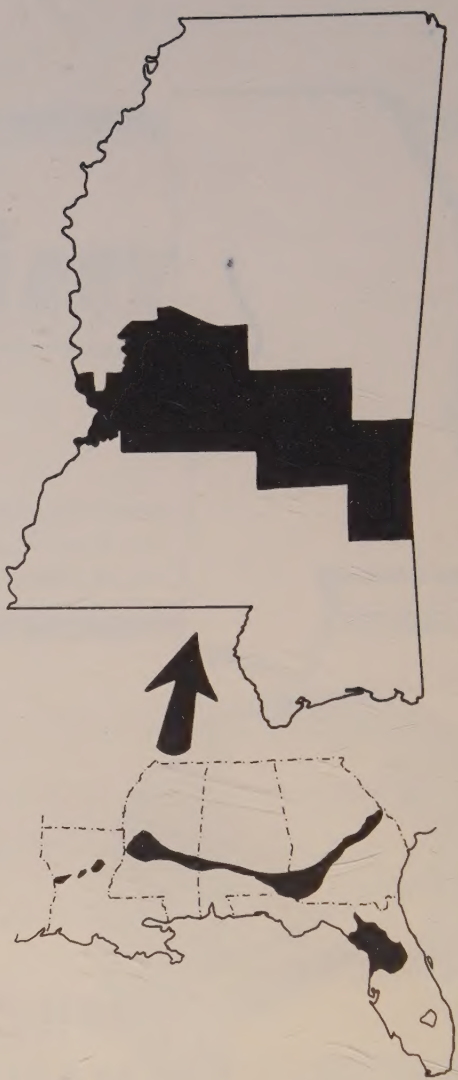

Figure 2. A generalized map of the Jackson Group in surface outcrop in the southeastern United States and map of Mississippi showing counties which have produced archaeocete fossils.

During the Eocene, the Gulf of Mexico extended over most of Florida and parts of Georgia, Alabama, Mississippi, Louisiana, Texas, and even into Arkansas. The ancient seas left behind sediments encasing fossils of plants and animals which lived in those marine environments. Figure 2 illustrates the general extent of surface outcrop of the Eocene Jackson Group in the Southeast. It is in this geologic area that archaeocete whales have been found as fossils. Mississippi has produced an abundance of records from Clarke, Hinds, Jasper, Madison, Newton, Rankin, Scott, Smith, Warren, Wayne, and Yazoo Counties (Domning, 1969). During the last decade several important discoveries of these ancient animals have taken place in Mississippi.

Probably the first important find of archaeocete whales in Mississippi was made by the late Dr. J. Magruder Sullivan

of Millsaps College. In April of 1933, a partial skull of the genus *Zygorhiza* was found by Dr. Sullivan and others about two miles east of the North State Street entrance of Millsaps College, Jackson, Hinds County (Kellogg, 1936). *Zygorhiza* was much smaller than the giant *Basilosaurus*, only reaching a length of 20 feet. Figure 3 compares the skeletons of both archaeocete genera. Since the Millsaps find, other discoveries have not been studied.

During the late 1960's a paleontological expedition from the Los Angeles County Museum of Natural History, under the direction of Dr. Shelton Applegate, surveyed the Jackson Group of east-central Mississippi for archaeocete whale remains. The fieldworkers collected both *Basilosaurus* and *Zygorhiza* specimens from the area of Scott County and returned to California, where the specimens rest today.

sissippi for Mississippians to see. The fossil whale has been donated to the state and is currently under the care of the Mississippi Museum of Natural Science in Jackson. The whale will be the first totally reconstructed fossil vertebrate in the state and is probably the most complete one of its kind in the world. The Yazoo County find includes the most complete archaeocete skull known, both mandibles, approximately 20 ribs, 50 vertebrae, but no limb bones. After detailed study and comparisons with other archaeocete skulls, the discovery will add important information to understanding the relationship between *Basilosaurus* and *Zygorhiza*. Dockery (1974) presents a photograph of the skull and describes the geologic occurrence of the Yazoo County archaeocete.

Are there whales in Mississippi? Certainly, many have been found and more await discovery!

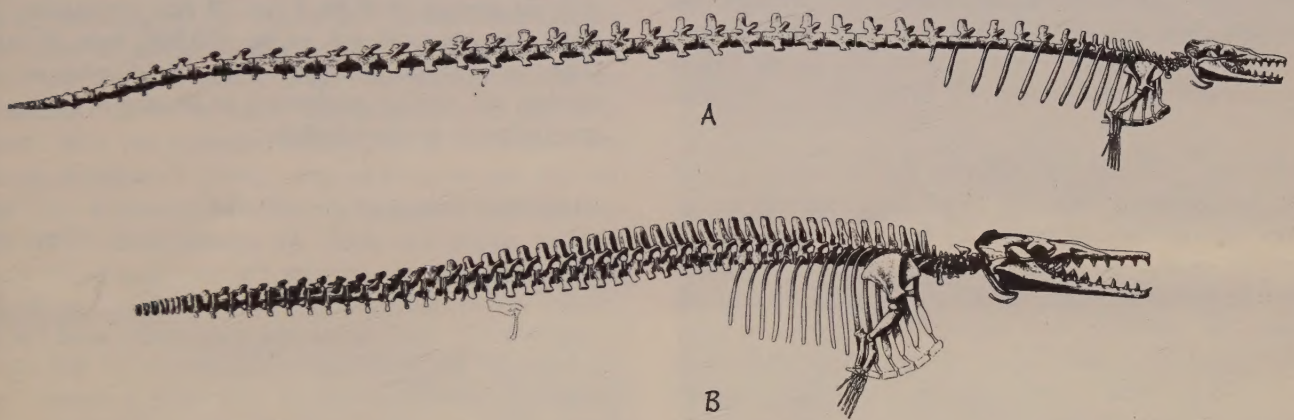

Figure 3. Reconstructions of skeletons of the archaeocetes (A) *Basilosaurus cetoides* and (B) *Zygorhiza kochii*. (Scales unequal) (Taken from Kellogg, 1936).

In April of 1970, a group of geologists and students from the University of Southern Mississippi collected a near complete skeleton of *Basilosaurus* from a farm in Jasper County. This specimen is on partial display at the University of Southern Mississippi's Frazier Museum of Natural History. Many other finds have been made over the years, but none to date reach the importance of a Yazoo County discovery.

Probably the most important archaeocete find in the Southeast was made in 1971 by the Mississippi Gem and Mineral Society. Members of the Society, while searching a creekbed just south of Yazoo City, discovered approximately 80% of a small archaeocete *(Zygorhiza kochii)*. After contacting the Smithsonian Institution and Los Angeles County Museum, the Society decided the discovery was a rare find indeed and should remain in Mis-

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MISSISSIPPI SURFACE MINING AND RECLAMATION – A WORKING EXAMPLE

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In Mississippi, surface mining is a large industry. In 1977 approximately 36,000 acres of land in Mississippi were being actively mined or had been abandoned. The vast majority of these lands were not reclaimed to a useful purpose. In fact, in many cases the mined land has contributed to erosion, sedimentation, and water degradation as well as posing safety and health hazards. In response to the above and to federal legislation, the Mississippi Legislature passed the Mississippi Surface Mining and Reclamation Act in the spring of 1977. The intent of the act was to restore land affected by surface mining to a useful, productive, and beneficial purpose. The Mississippi Geological Survey (now the Bureau of Geology) was charged with administering and enforcing the provisions of the act. Regulations were promulgated by the Survey and became effective on April 15, 1978.

Sand and gravel mining comprises the largest segment of the surface mining industry. Near Crystal Springs, Mississippi, several mining companies have developed an extremely productive gravel deposit. It was from this area that the first surface mining permit application was received under the new law. The application was submitted by Heyward Carter Green of Green Brothers Gravel Company. Although the application was for only 5 acres, the permit area was representative of mining throughout the surrounding area.

To apply for a surface mining permit, mining operators are required to complete a 16-page permit application form and submit the completed form to the Mining and Reclamation Section of the Bureau. The form contains a mining plan and a reclamation plan. The decision to approve or deny the permit application is based on the completed form and a site inspection of the permit area by inspectors of the Mining and Reclamation Section. If approved, the permit is valid for 5 years.

As required by the application form, Green Brothers Gravel Company attached a topographic map and engineering drawing indicating the location of the permit area. Besides outlining the permit area, the maps and drawings also indicated wells, cultural features, bodies of water, roads, parks, cemeteries, schools, churches, etc. A lease agreement, certificate of insurance, and performance bond were also included as required. The lease agreement was proof of Green Brothers Gravel Company's right to mine. The insurance certificate indicated the amount of public liability insurance the company carries. The performance bond was in an amount estimated to be the cost of reclamation of the permit area. The purpose of the bond was to insure reclamation of the permit area in case of default by Green Brothers Gravel Company.

The mining plan contains information about the material to be mined, the overburden removed, and the excavation. From the application, the area was described as having a sand and gravel deposit averaging 20 feet in thickness with an average of 2 to 4 feet of clay overburden. The yield was approximated to be 100,000 tons of gravel. Other information included in the mining plan was the number and type of equipment to be used in mining and an anticipated mining schedule.

Background information concerning surface and subsurface waters was given. All existing water wells within one-half mile of the mine site were listed. The depth to the known ground-water table was found to be 200 feet, which is well below the excavation depth. A description of the anticipated consequences of the mining operation to the interference with the ground-water gradient, recharge condition, interruptions of natural surface drainage, and flood-prone conditions was given as well as plans for control of erosion and siltation. In the engineering methods section, Green Brothers Gravel Company discussed the use of diversion ditches and holding ponds to minimize runoff and siltation from the mining site.

A large portion of the permit application deals with reclamation, including land use, topsoil handling, and revegetation. The premining land use consisted of pasture and scattered timber. After mining, Green Brothers Gravel Company intends to produce medium yield pine timber on the permit area. The land use will change from primarily pasture to timber production. To achieve this reclamation goal, the topsoil was segregated during overburden removal and stockpiled until completion of the mining. After mining, the overburden was backfilled against the highwall face on the western boundary of the permit area. Banks were graded to 4:1 slopes and the remainder of the area reduced to a rolling contour. The stored topsoil was then plated over the entire area.

The revegetation plan described in the application and carried out in the field was to fertilize the area with 800 pounds of 13-13-13 fertilizer per acre. The entire area was disced, harrowed, and seeded with Coastal Bermuda grass at the rate of 40 pounds per acre. The following winter pine seedlings were to be planted.

As verified by the accompanying photograph taken in the spring of 1980, the permit area was returned to a gently rolling topography with an excellent coverage of Bermuda grass. The area experienced minimal erosion and gullying during the establishment of the vegetation. Because of the reclamation success, Green Brothers Gravel Company applied for and was granted an 80% release of their performance bond. The remainder of the bond will be subject to release at the end of a two-year revegetation period. This two-year period insures that the grass and/or trees have been completely established and that the operator has completed all remaining reclamation activities.

As of this writing, the Mining and Reclamation Section has issued 67 surface mining permits involving 2,283 acres. Materials that are mined under the permits consist of bentonite, limestone, clay, fill material, and sand and gravel. With the successful reclamation of Green Brothers Gravel Company's permit area, indications are that all permitted land can be returned to a useful, productive, and beneficial purpose.

Figure 2. Unreclaimed land adjacent to the permit area.

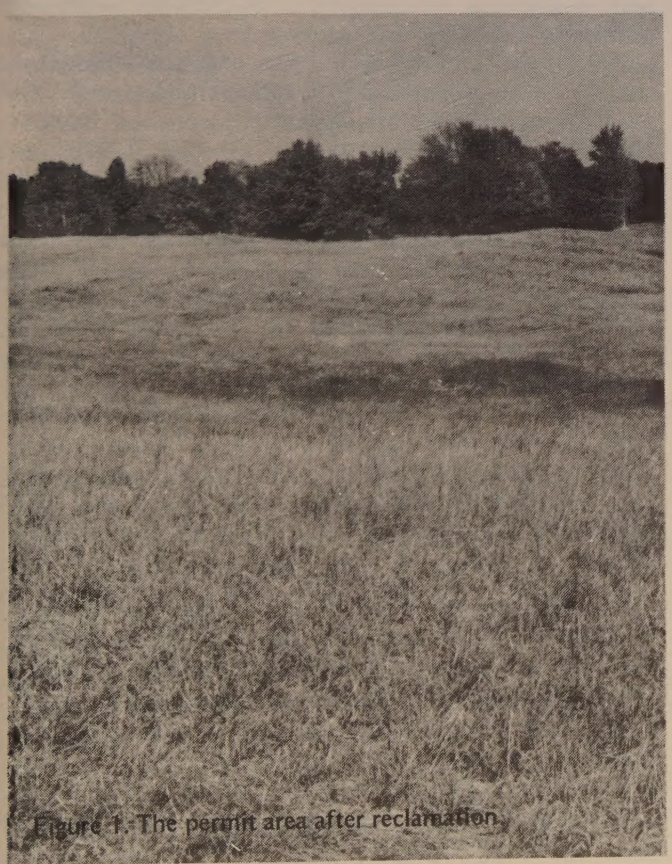

Figure 1. The permit area after reclamation.

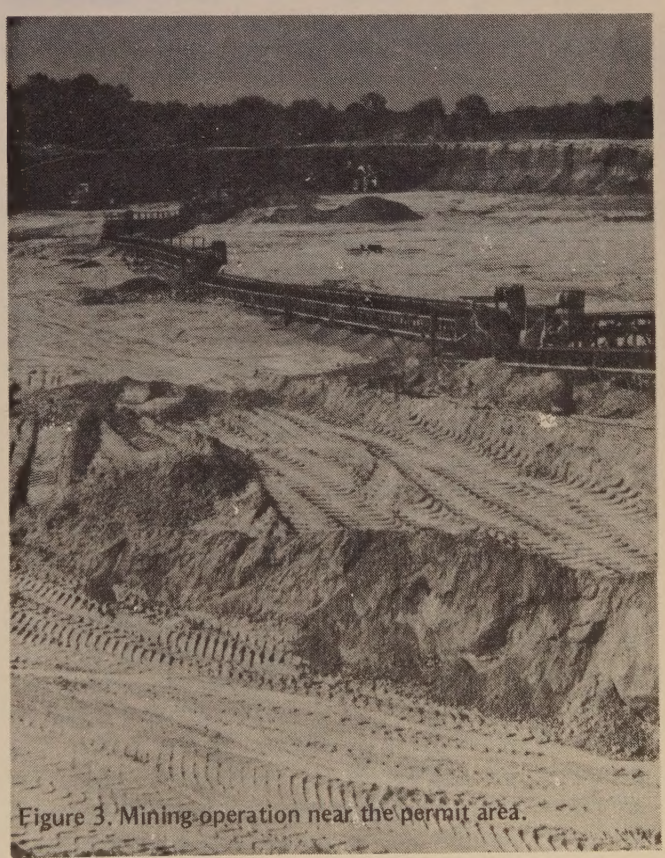

Figure 3. Mining operation near the permit area.

THE LOWER TUSCALOOSA OF SOUTHERN MISSISSIPPI

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Mississippi Bureau of Geology

The Lower Tuscaloosa formation of the Upper Cretaceous is currently producing primarily oil from more than fifty fields in the Interior Salt Basin of Mississippi. These fields are located within an area extending from eastern Louisiana (Fig. 1) into southwestern and south-central Mississippi (Jefferson, Adams, Franklin, Lincoln, Amite, Pike, Walthall, Lamar, Forrest, and Pearl River Counties). Stratigraphically, the Lower Tuscaloosa unconformably overlies Lower Cretaceous sediments of the Dantzler Formation and underlies the Upper Cretaceous shales of the Middle Tuscaloosa (Fig. 2). The formation consists of a transgressive sequence that grades upward from alluvial plain through delta to marine deposits (Scull et al., 1966; Berg and Cook, 1968; Mann and Thomas, 1968).

In Mississippi the Lower Tuscaloosa is divided into the Massive sand member and the Stringer sand member. The Massive sand is usually the basal unit of the Tuscaloosa and consists of a 250-foot thick section of sandstones. It is absent in the extreme southwestern part of the State due to non-deposition over the Adams County Uplift. On electric logs the Massive sand is characterized by high SP deflections and low induction and lateral resistivity curves.

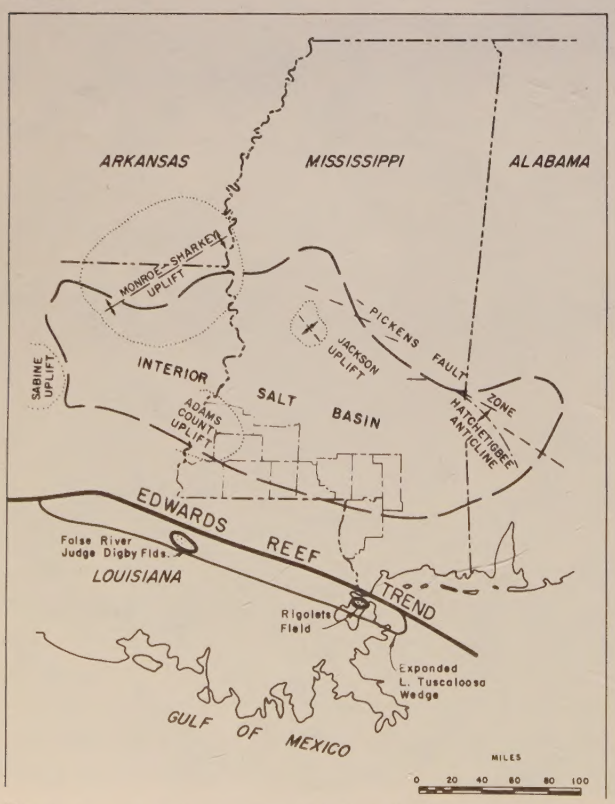
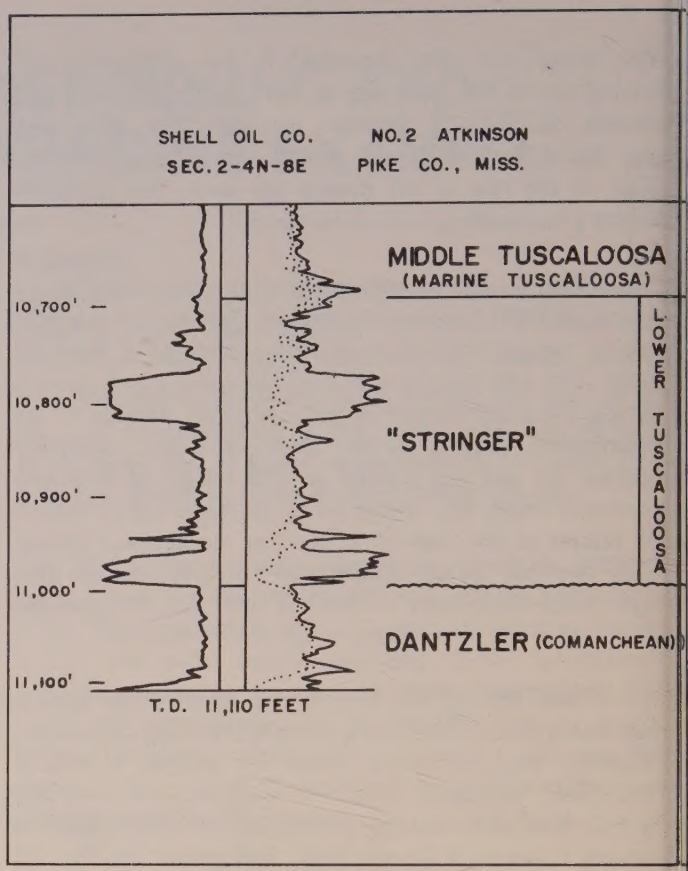


Figure 1. Location map of Mississippi outlining counties which have Lower Tuscaloosa production.



Overlying the Massive sand is the Stringer member, from which most of the Lower Tuscaloosa production in the State is obtained. Lithologically, the Stringer consists of alternating gray, fine- to medium-grained sandstones with associated gray and red, silty shales. Siltstones and mudstones are also common. In southern Mississippi the producing sandstones are found at depths of 10,000-12,000 feet. They are typically variable in thickness, discontinuous, and exhibit sinuous patterns on sand isopach maps. Such characteristics are indicative of channel sands deposited in fluvial-deltaic settings (Scull et al., 1966; Berg and Cook, 1968). On electric logs the Stringer exhibits higher SP and resistivity values than the overlying shales of the Middle Tuscaloosa.

Prospecting for oil and gas as well as developing new fields in the Lower Tuscaloosa can be difficult. There is generally a lack of strong structural closure; accumulation of oil and gas is controlled largely by stratigraphy, with lenticular sands pinching out into shales. Electric log cross-sections are inadequate for delineating the reservoirs because these channel sands are discontinuous and cannot be correlated over any sizeable area. Basically, geophysical data and lithofacies maps are the best tools for projecting sand trends. Due to the discontinuous nature of the sands, field development is often limited to four producing wells or less.

The Lower Tuscaloosa has been an exploration objective since the 1940's when Brookhaven (Lincoln County), Baxterville (Lamar and Marion Counties), Cranfield (Adams and Franklin Counties), and Mallalieu (Lincoln County)

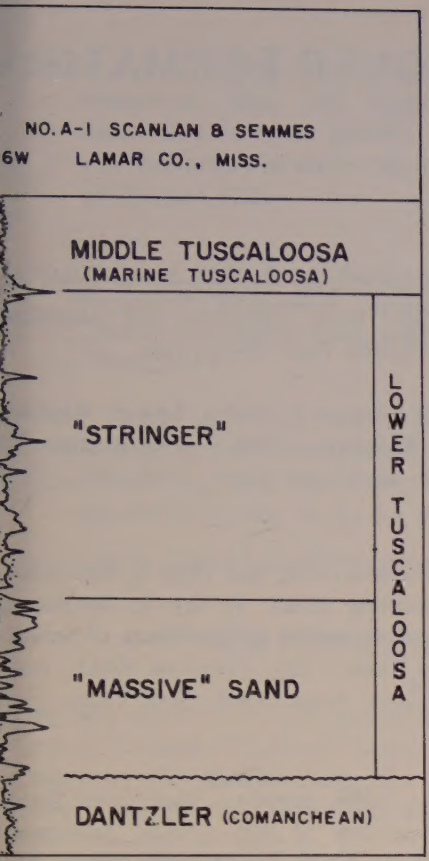


Figure 2.
Type Logs of Lower Tuscaloosa Formation
(After Watkins, 1962)

Fields were discovered. These fields are a few of the more successful Lower Tuscaloosa development programs when viewed in terms of reservoir size and field longevity. Each field has a large reserve because it is situated on a dome associated with a deep-seated salt structure. Two of these fields, Brookhaven and Baxterville, also have highly faulted structural traps. The largest oil producer among these is Baxterville Field, which has produced over 130 million barrels of 12 to 19-gravity oil and more than 21 billion cubic feet of gas during the past thirty-six years. In Baxterville Field the average reservoir porosity is 23.6% and permeability varies from 0-3,000 millidarcies. The Lower Tuscaloosa oil pool in Cranfield Field produced over 37 million barrels of 40-gravity oil and over 600 billion cubic feet of gas from 1943 through 1972. Average reservoir porosity in this field is 25.2% and the permeability range is 0 to 8,690 millidarcies.

Most of the Lower Tuscaloosa fields, however, have predominantly stratigraphic traps. This accounts for the smaller size of these reservoirs relative to those associated with deep-seated salt structures. On average, the annual oil production for these fields falls within the range of 1,000-25,000 barrels, while annual gas production is within the range of zero to approximately 18 million cubic feet. Smithdale Field in Amite County is an example of another successful, long-term Lower Tuscaloosa development program involving a predominantly stratigraphic trap. In 1979 it produced 25,876 barrels of 42-gravity oil and 18.9 million cubic feet of gas. Since its discovery in 1960, the cumulative oil production is more than 8 million barrels of oil and 8.4 billion cubic feet of gas. Reservoir porosity is 15-30% and permeability ranges from 5-500 millidarcies.

Interest in Lower Tuscaloosa exploration reached an all time high during the 50's and 60's, and since then drilling activity has slowed to a moderate, steady pace. The more recent field discoveries do not have the longevity of the earlier fields; a seven year production span is the average, and some have stopped producing after only one or two years. Within the past two years several fields have been discovered, including Tangipahoa River, Vaughts, and Fernwood Fields in Pike County and Gordon Creek Field in Amite. Tangipahoa River's annual production for 1979, from the discovery well, was 157 barrels of 40-gravity oil and 16 thousand cubic feet of gas. Last year Vaughts Field produced 39,411 barrels of 37-gravity oil and no gas from two wells. Fernwood Field, discovered December 1978, also produced from two wells for a total of 20,794 barrels of 39-gravity oil and no gas. The discovery well for Gordon Creek Field was completed in August 1980; it flowed 107 barrels of 50-gravity oil and 750 thousand cubic feet of gas per day. Obviously, the Lower Tuscaloosa of southern Mississippi is still a viable and profitable exploration objective.

In contrast to the Tuscaloosa reservoirs of Mississippi, the lucrative deep Tuscaloosa gas trend of Louisiana has a slightly different depositional history. At the end of Lower Cretaceous time, northern Louisiana, Arkansas, and Mississippi were uplifted while southern Louisiana remained submerged. During this time the Tuscaloosa sediments of southern Louisiana were carried by a number of fluvial distributary systems over the Lower Cretaceous Edwards reef complex, which marked the edge of the continental shelf (Funkhouser et al., 1980). The sediments were then deposited in deltaic to near-shore marine environments. When the river breached the reef, Tuscaloosa sediments were carried onto the steep incline of the continental slope and deposited in a series of deltas (Petroleum Information Corp., 1980). On the forebank side of the reef stratigraphic traps for hydrocarbon accumulation formed in the deltaic areas where Tuscaloosa sediments pinch out against impermeable Lower Cretaceous sediments. Structural traps formed by growth faulting. Currently drilling depths to the deep Tuscaloosa are 16,000-22,000 feet. The high cost of drilling, $5-15 million/well, is offset by the productivity of the wells. The average daily gas production for the entire deep Tuscaloosa trend is presently 198 million cubic feet. The cumulative production of all wells, from the discovery in 1975 to March 1980, is 82.6 billion cubic feet of gas and 1.7 million barrels of condensate (Funkhouser et al., 1980). An interesting future study would be the analysis of the Lower Tuscaloosa sands between southern Mississippi and the deep Tuscaloosa gas trend of Louisiana.

Continued on Page 12.

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NEW PUBLICATIONS

Two new works have been published by the Bureau of Geology: Bulletin 121, Clarke County Geology and Mineral Resources; and Bulletin 122, The Invertebrate Macropaleontology of the Clarke County, Mississippi, Area. Two abstracts in Bulletin 121 are reprinted below as is the abstract from Bulletin 122.

Clarke County Geology and Mineral Resources*

Clarke County Geology

by William A. Gilliland

Clarke County, located in east-central Mississippi, is bounded to the north by Lauderdale County, to the west by Jasper County, to the south by Wayne County, and to the east by Choctaw County, Alabama. The county is located within the parallels 31 degrees 49 minutes and 32 degrees 15 minutes north latitude and within the meridians 88 degrees 25 minutes and 88 degrees 55 minutes west longitude. Total area of the county is 697 square miles. Quitman is the county seat.

Strata exposed in Clarke County are of Tertiary and Quaternary age. Exposed units in ascending order are: Hatchetigbee Formation of the Wilcox Group - Eocene age; Tallahatta Formation, Winona Formation, Zilpha Formation, Kosciusko Formation, Cook Mountain Formation, and Cockfield Formation of the Claiborne Group - Eocene age; Moodys Branch Formation and Yazoo Formation of the Jackson Group - Eocene age; Red Bluff Formation and Vicksburg Group - Oligocene age; Catahoula Formation - Miocene age; Citronelle Formation and terrace deposits - Pleistocene age; and alluvium - Recent age.

A regional dip of approximately 30 feet per mile to the southwest is indicated for the near-surface strata of Clarke County. Further, numerous faults are present in a zone extending from southeastern Clarke County to the central part of the county, then to west-central Clarke County.

Mineral resources of present or possible future economic importance are gravel, sand, clay, marl, sulfur, natural gas, and petroleum.

Water Resources of Clarke County, Mississippi *

by Danny W. Harrelson

Abstract

Ground water is available in Clarke County in sufficient quantities for present rural, municipal, public, or industrial demand. Potable ground water is present in thirteen aquifers from Eocene through Holocene ages. Wells completed in these aquifers vary in depth from 69 feet in northern Clarke County to 2386 feet in southern Clarke County. Quality problems of the ground water produced from these aquifers include excess color, a pH below 7.0, total dissolved solids above 500 milligrams per liter (mg/l), and iron concentrations in excess of 0.3 mg/l. Transmissibilities for the aquifers in Clarke County vary from 4000 to 172,000 gallons per day per foot (gpd/ft) and yields can exceed 500 gallons per minute (gpm). Hydrostatic head within the major aquifers is sufficient to cause many wells to flow or have a static water level which rises to within a few feet of the land surface.

The Wilcox aquifers are the only relatively undeveloped aquifers in Clarke County. These aquifers have the best

*Gilliland, W. A. and D. W. Harrelson, 1980, Bull. 121, Dept. of Natural Resources, Bureau of Geology; Jackson, MS.

potential of any ground-water or surface-water source in Clarke County due to excellent static water levels, good chemical quality, and high yields. The Wilcox aquifers could adequately support additional municipal, public, rural, or industrial development within the county, and should prove to be a valuable ground-water source into the next century.

Surface water is available in large quantities from the Chickasawhay River and Bucatunna and Souinlovey Creeks. These surface-water sources are limited by low flow, so impoundment must be considered to increase surface-water supplies. The surface-water quality is good, and can be used for most purposes with only a minimum of treatment. Brine pollution of surface-water sources is restricted, and should pose few future contamination problems provided leaking salt-water evaporation pits are eliminated.

The Invertebrate Macropaleontology of the Clarke County, Mississippi, Area†

by David T. Dockery, III

ABSTRACT

This report concerns the paleontology and stratigraphy of the Eocene and Oligocene sedimentary units in Clarke and parts of neighboring Lauderdale, Newton, Jasper, and Wayne Counties, Mississippi. Fossils from these units are discussed systematically and are figured in plates arranged according to their stratigraphic sequence. The 346 species, subspecies, and variations discussed and figured include: 2 foraminifers, 24 corals, 5 bryozoans, 1 chiton, 188 gastropods, 1 cephalopod, 5 scaphopods, 109 bivalves, 1 barnacle, 4 decapods, and 6 echinoids. Two gastropod species and one subspecies and three bivalve species are named as new. Microfossils are not included in this report.

Measured sections and photographs are given for exceptional exposures of Clarke County and some Lauderdale County formations. The depositional environments of these formations are discussed based on a consideration of the unit's paleontology, lithology, and stratigraphic relationships. A new, fossiliferous, marine, stratigraphic unit recognized in the upper Kosciusko Formation is named the Dobys Bluff Tongue. As many of the fossiliferous Eocene and Oligocene units of Mississippi crop out in Clarke County, this report may serve as a guide to the paleontology and stratigraphy for a large part of the State's Tertiary sequence.

†Dockery, D. T., 1980, Bull. 122, Dept. of Natural Resources, Bureau of Geology; Jackson, MS

CALENDAR OF EVENTS

1981 January - March

January 19-20 - Hazardous solid-wastes testing, symposium, Ft. Lauderdale, Fla. (American Society for Testing and Materials, 1916 Race Street, Philadelphia 19103)

March 9-11 - Energy Technology Conference and Exposition, Washington, D. C. (Government Institutes, Inc., Box 5918, Washington, D. C. 20614. Phone: 301/656-1090) "New Fuels Era"

March 18-20 - Southeastern Section, Geological Society of America, ann. mtg., Hattiesburg, Mississippi. (Daniel A. Sundeen, Dept. of Geology, University of Southern Mississippi, Box 8196, Southern Station, Hattiesburg 39401. Phone: 601/266-7195)

DRILLING ACTIVITY IN MISSISSIPPI

Total New Wells Drilled

	Oil	Gas	Dry	Suspended	Total
Aug. 1980	12	7	36	–	55
Aug. 1979	8	9	25	6	48
Aug. 1978	4	6	26	–	36

Exploratory Wells Drilled

	Oil	Gas	Dry	Suspended	Total
Aug. 1980	–	2	22	–	24
Aug. 1979	–	1	20	3	24
Aug. 1978	2	2	16	–	20

PRICE OF CRUDE

Currently Gulf Coast sweet crude is priced at $38/barrel (OGJ - September 29. 1980.)

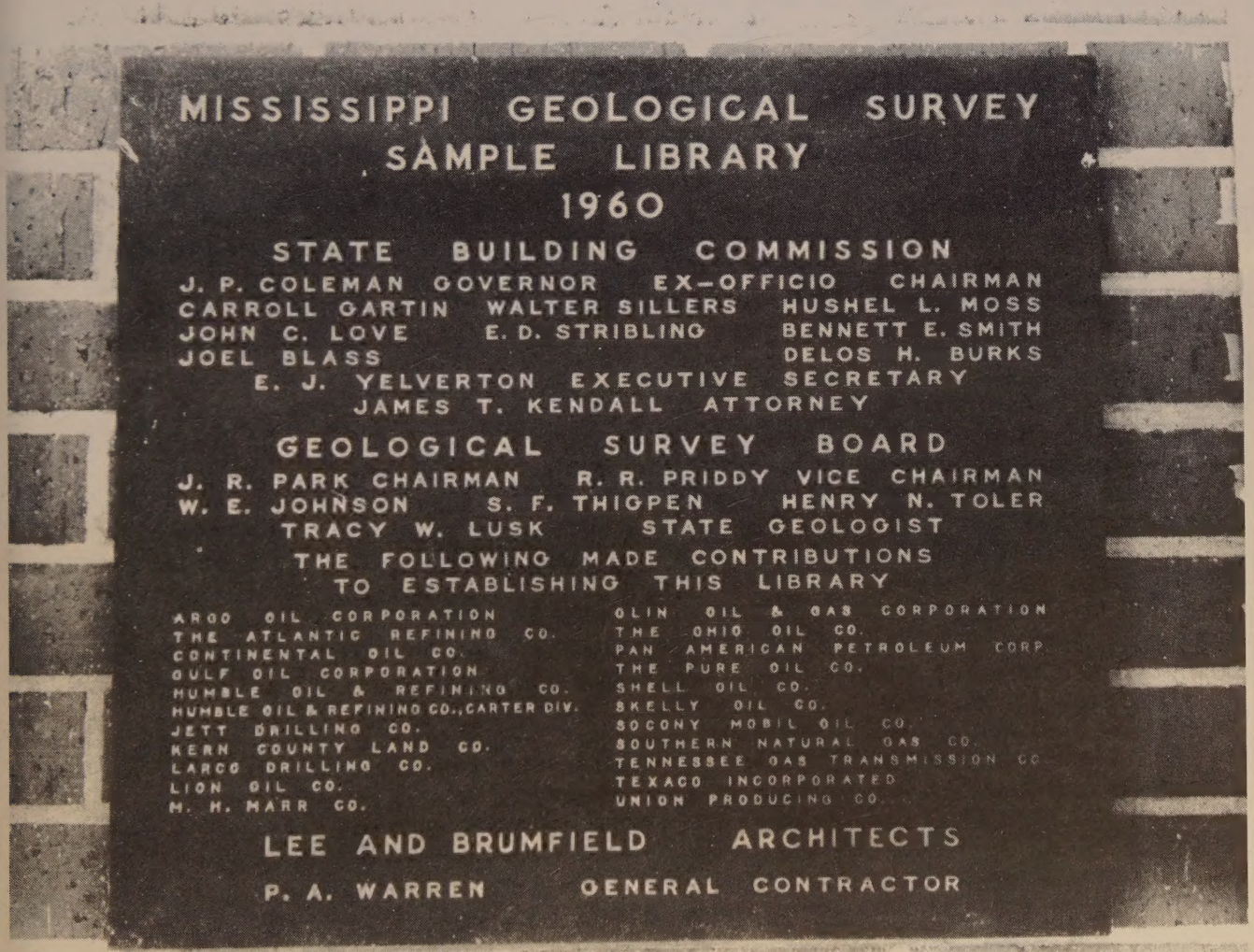
DRILLING NOTE

By October 17, 1980, investigation of the geologic suitability of sanitary landfills and other waste disposal sites had led to almost five miles of test hole drilling (25,889 feet) by the Environmental Geology Section of the Bureau of Geology at hundreds of sites around the state.

The editors wish to express their sincere appreciation to Sondra Armstrong for her fine work in typesetting the first two issues of *Mississippi Geology*.

1850 – 1980 - GEOLOGY CELEBRATES 130 YEARS OF SERVICE TO MISSISSIPPI

The Mississippi Geological Survey was first created by the Legislature in 1850 as a part of the University of Mississippi in Oxford. Within the next ten years, it published the first three major reports on the geology and agriculture of Mississippi. At the outbreak of the Civil War, the University was suspended; the Governor appointed the State Geologist, Dr. Eugene W. Hilgard, to take charge of the State property at the University. Dr. Hilgard, along with Dr. A. J. Quinche, was instrumental in saving the University buildings from being destroyed when General Grant's army entered Oxford in 1862. After the Civil War, the Survey became a casualty of the economics of Reconstruction. There was no active Survey from 1872 until its re-establishment in 1906 as the Mississippi State Geological Survey. In 1958 the Legislature reorganized the Board governing the agency. Soon thereafter the agency became known as the Mississippi Geological, Economic and Topographical Survey and moved its offices from the University to Jackson. The Survey was reorganized again in 1979 as the Bureau of Geology within the new Mississippi Department of Natural Resources.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This year, 1980, marks the twentieth anniversary of the building housing the Bureau of Geology (Mississippi Geological Survey). The plaque at the entrance of the building lists all the individuals and companies responsible for the building and the establishment of the fine sample library.

Mississippi Geology is published quarterly in March, June, September, and December by the Mississippi Department of Natural Resources, Bureau of Geology. Contents include research articles pertaining to Mississippi geology, news items, reviews, and listings of recent geologic literature. Readers are urged to submit letters to the editor and research articles to be considered for publication; format specifications will be forwarded on request. For a free subscription or to submit an article, write to:

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